REMARKS

Claims 1-4 and 6-20 remain pending after amendment.

Claim Amendments

By this amendment, claim 1 is amended in a manner which is believed to more clearly define the claimed invention. Further, claim 5 is canceled, and the limitations thereof added to claim 1. No new matter is added by this amendment.

Withdrawn Rejections

Applicants note with appreciation the withdrawal of the prior rejections over Koichi et al, Ota et al, and JP '170.

Rejection under 35 USC 112 (paragraph two)

Claims 1-8 stand rejected under 35 USC 112 (paragraph two) as not distinctly claiming the invention. This rejection is respectfully traversed to the extent deemed to apply to the claims as amended.

In response, claim 1 is amended to recite the presence of silica particles of a size of from 10 to less than 40 nm as suggested by the Examiner. The rejection is thus believed to be moot and should be withdrawn.

Objection to Claim 1

Claim 1 is objected to for the reason that the size limitation should appear at the end of the claim, and the phrase "and 50" should be "plus 50". In response, claim 1 is amended to address these two informalities.

The objection is thus moot and should be withdrawn.

Applicants' Claimed Invention

Applicants' claimed invention is directed to a polishing composition for memory hard disk comprising water having a pH of from 1 to 4.5 and an abrasive consisting essentially of silica particles, wherein the silica particles have a particle size of from 10 to less than 40 nm are present in said composition, and in which a relationship of a particle size (R) in nm at a range of from 40 to 45 nm and a cumulative volume frequency % (V) in a graph of particle size-cumulative volume frequency obtained by plotting a cumulative volume frequency (%) of the silica particles counted from a small particle size side of particles less than 40 nm in size satisfy the relationship where the cumulative volume frequency (V) in % is determined to be greater than or equal to the sum of the particle size (R) in nm plus 50, and wherein the particle size is determined by observation with a transmission electron microscope (TEM).

The above relationship (defined by the formula $V \geq R + 50$) over the range of 40 to 45 nm means that the cumulative volume frequencies are 90% or more (at a size of 40 nm) and 95% or more (at a size of 45 nm). In other words, the polishing particles expressed by the noted relationship include 5% or less of particles having the particle size of more than 45 nm so that particles of large size are substantially excluded from the composition. At a particle size of 40 nm, the composition will include only 10% or less of larger size particles.

The previously-submitted tables (Exhibit A) and graphs (Exhibit B) demonstrate the manner by which particle size distribution is determined according to the claimed invention. The claimed relationship is satisfied only in Case 1 among exemplified Cases 1-3. As only the diameter of the largest particles differs, the cumulative volume frequency in % changes largely at the particle sizes of 40 nm and 45 nm. Note that the largest particle size in Case 1 is 45 nm, the largest particle size in Case 2 is 50 nm, and the largest particle size in Case 3 is 60 nm.

Further, as shown in the table of Case 1, the particle sizes of most particles is less than 40 nm. That is, 87.8% of the particles are less than 40 nm, with particles which are 40 nm in size being only 5%. While the particle size composition of Cases 2 and 3 is similar to that of Case 1 with respect to particle sizes of less than 40 nm, the volume frequency of Cases 2 and 3 differs due to the presence of larger particles than in Case 1. That is, Cases 2 and 3 have a volume frequency at 45 nm of only 90.4% and 84.5%, respectively, which each fall below the minimum value for the claimed invention of 95% for that particle size.

The claimed invention is neither disclosed nor suggested by the prior art.

Rejections under 35 USC 103(a)

Claims 1-8 stand rejected under 35 USC 103(a) as being unpatentable over Rostoker et al. This is the sole remaining rejection under 35 USC 103(a). This rejection is respectfully traversed to the extent deemed to apply to the claims as amended.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

In support of the rejection, the Examiner admits that while the reference:

> "fails to literally teach that V (%) is determined to be equal to or greater than the sum of the particle size (R) plus 50, where R is 40-45 nm, as defined in claim 1, the size of the silica of the reference can be 40-45 nm (X value) and the size distribution (Y value) can be extremely small (as is apparent from the interpretation of 'P' being less than 50% (i.e., reads on 0.001%). Since X can be 40 nm and/or 45 nm and Y is P percent of X, Y can be 0.001% of 40 nm and/or 0.001% of 45 nm. In view of this, particles less than 40 nm can be present with the bulk of the particles being 40 nm and/or 45 nm and thus since the size of the bulk of the particles can be same, it is the examiner's position that the volume of particles of this size is greater than 90% absent clear comparative evidence."

In essence, the Examiner appears to be stating that very small amounts of particles less than 40 nm in particle size may be present, while essentially mono-size particles having a size of 40 or 45 nm may also be present, which, on a volume (versus weight) percent, appear to inherently meet the claimed invention.

Rostoker et al discloses a method of polishing semiconductor substrates with alumina. The reference merely teaches that the alumina can be substituted with silica having a particle size of 10-100 nm. The reference is otherwise totally silent with respect to teaching any aspect of the claimed invention.

Further, the reference teaches at column 7, lines 45-47 that "Aluminum oxide exhibiting the aforementioned characteristics is superior to colloidal silica, since acidification of colloidal silica results in flocculation". Thus, the reference appears to teach away from the substitution of aluminum with silica under acidic conditions. In an attempt to more clearly distinguish over the reference in this

regard, claim 1 is amended to provide for a pH of from 1 to 4.5 as previously recited in claim 5 (now canceled).

By way of further attempt to more clearly distinguish over the reference, claim 1 is amended to state that the abrasive particles consist essentially of silica particles. Such a limitation is believed to distinguish over the use of alumina particles as taught by the reference.

As a result, the reference is believed to teach away from the claimed invention. Characteristics of alumina particles are taught (X, Y, and Z) at column 7, lines 4-26 of the reference. Such characteristics appear to be specific as to alpha aluminum oxide particles. Thus, the reference fails to teach or suggest the recited distribution in the case of the use of silica particles alone as claimed.

Further, an average particle size (X) cannot be definitively determined based on the disclosure of the reference for the following reasons:

(1) The average particle size differs drastically depending upon the determination method used such as TEM image analysis (the method used in the present invention), optical measurement, specific surface area method, and crystal size by X-ray analysis.

(2) The particle shape of alumina is polygonal while that of colloidal silica is substantially spherical.

(3) Alumina is secondarily aggregated, while colloidal silica is monodispersed.

Also, not any alumina can satisfy the requirement of Example 3 of the reference. That is, since alpha alumina is obtained by baking at high temperature, pulverization is not necessary so that its distribution is generally broad. Thus, the reference does not teach alpha alumina consisting of particles of which the size is 10 nm. Moreover, alumina of which size distribution is 0.001% cannot be produced as asserted by the Examiner at page 3 of the Action. Even if such a small size of alumina

could be produced, superior surface roughness as in the present invention would not be obtained because the surfaces of pulverized particles are angulated.

In view of the above, the rejection under 35 USC 103(a) is without basis, and should be withdrawn.

The application is now in condition for allowance, and an early indication of same is earnestly solicited.

Should the Examiner have any questions concerning the present reply, he is respectfully requested to contact the undersigned at the telephone number provided.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Dated:

Respectfully submitted,

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